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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/810,971	03/16/2001	Sheng Huang	10984.3USI1	7444

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EXAMINER	
SIMITOSKI, MICHAEL J	

ART UNIT	PAPER NUMBER
2134	

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/810,971	HUANG ET AL.	
	Examiner	Art Unit	
	Michael J. Simitoski	2134	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,12-31 and 34-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,12-31 and 34-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The response of 8/28/2006 was received and considered.

2. Claims 1-9, 12-31 & 34-45 are pending.

Response to Arguments

3. Applicant's arguments with respect to claims 1-9, 12-31 & 34-45 have been considered but are moot in view of the new ground(s) of rejection.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification does not describe a computer-readable medium storing the watermark.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 23-31& 34-45 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims recite an optical watermark stored on a computer-readable medium. As the specification does not describe a computer-readable medium, this is understood to be a storage medium (such as a disk or memory), as opposed to a transmission medium (such as a signal or carrier wave). Despite being tangibly embodied,

however, a watermark is a non-functional data structure, and therefore does not fall within one of the four statutory classes of invention at least because it does not create a functional interrelationship between the medium and the watermark.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not describe a computer-readable medium storing the watermark.

9. Claims 23-31& 34-45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant has not described how an optical watermark, which is something visible, can be stored on a computer-readable medium.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1-9, 12-31 & 34-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Regarding claims 1-7, it is unclear if the decoder is matching the phase modulated dot pattern or the original dot pattern.

b. Regarding claim 23-29, it is unclear if the decoder is matching the phase modulated dot pattern or the original dot pattern

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 1-4, 6-9, 13-16, 20-26, 28-31, 35-38 & 43-45, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,104,812 to Koltai et al. (**Koltai**) in view of U.S. Patent 6,252,971 to **Wang**.

Regarding claims 1-3, 7, 23-25 & 29, Koltai discloses determining a required plural number of watermark layers (Fig. 15) and a dot patterns/secondary images for each of the plurality of watermark layers (pixel pattern of the actual layer to be modified), selecting at least one latent image object/secondary images for each of the plural of watermark layers (col. 4, lines 11-16) and embedding each latent image object/secondary images into its respective watermark layer (col. 4, lines 11-16), superposing the watermark layers to form the watermark/overall

secondary image (col. 4, lines 40-44) , defining and generating a decoder for each watermark layer (col. 4, lines 11-16) and applying the watermark to the document/primary image (col. 4, lines 11-16). Koltai lacks explicitly embedding each latent image object into its respective watermark layer by phase modulation. However, Wang teaches that by using phase-modulated stoclustic screens (col. 2, lines 32-35), retrieval of a watermark after the image has been transferred to a printed copy is easy and provides clear, visible results (col. 5, lines 3-5). The halftone image is embedded using phase-shifted (phase-modulated clusters) (col. 3, lines 54-55, col. 4, lines 1-3, 29-34 & Fig. 7), whereby the watermark can be visualized by overlapping the stoclustic screen (phase-modulated dot pattern) with a checkerboard pattern (decoder) in the same halftone frequency (col. 4, lines 36-44). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Koltai to specifically embed each latent image object into its respective watermark layer by phase modulation. One of ordinary skill in the art would have been motivated to perform such a modification to make retrieval of a watermark/embedded latent image (after the image has been transferred to a printed copy) easy and to provide clear, visible results, as taught by Wang (col. 5, lines 3-5, 54-55, col. 4, lines 1-3, 29-44 & Fig. 7).

Regarding claims 4 & 26, Koltai discloses the dot pattern/stoclustic screen for each watermark layer being a linear coordinate mapping of a basic two-dimensional dot array (halftone dots (printed)) (Wang, Fig. 7, col. 2, lines 35-36 & col. 5, lines 3-5).

Regarding claims 6 & 28, Koltai discloses a random dot array (col. 8, lines 17-26).

Regarding claims 8-9 & 30-31, Koltai discloses the latent image objects containing information that is critical to the application (col. 11, lines 45-49).

Regarding claims 13 & 35, Koltai discloses wherein the decoder has a decoder structure related to a dot pattern (checkerboard) structure of a carrier dot pattern of the watermarked layer (unmodulated version) (Wang, Fig. 3 & Koltai, Figs. 19A-19J) and in the direction/45 degrees where the latent image object is embedded (Wang, col. 3, lines 14-19 & 54-63).

Regarding claims 14 & 36, Koltai discloses a conjunct/aligned (Wang, Fig. 2).

Regarding claims 15 & 37, Koltai does wherein after modulation, the watermark layer and its decoder each carriers part of the information of the latent image object which is generated based on the latent image object and a random function (col. 8, lines 17-26).

Regarding claims 16 & 38, Koltai discloses a difference between layers to avoid interference (col. 14, lines 47-51).

Regarding claims 20-22 & 43-45, Koltai discloses the watermarks being embedded into the various color channels (col. 14, line 46 – col. 15, line 10 & Fig. 15).

14. Claims 5 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & Wang**, as applied to claims 2 & 26 above, in view of U.S. Patent 4,828,644 to Ochoa et al. (**Ochoa**). Koltai discloses performing rotations (col. 4, lines 12-25), but lacks the dot pattern including a non-linear coordinate mapping of a basic two-dimensional dot array. However, Ochoa teaches that rotations are linear operations in polar coordinate space (col. 1, lines 23-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a non-linear coordinate mapping (polar) of a basic two-dimensional dot array. One of ordinary skill in the art would have been motivated to perform such a modification to perform linear operations resulting in a rotation, as taught by Ochoa (col. 1, lines 23-46).

15. Claims 12 & 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & Wang**, as applied to claims 11 & 33 above, in view of U.S. Patent 6,636,616 to **Harrington**. Koltai lacks smoothing to avoid abrupt changes. However, Harrington teaches that $W(x, y)$ (the watermarking function) should smoothly transition from one value to another (in this case from –1 to +1) to avoid abrupt visible transitions in the image (col. 5, lines 44-53). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a post-processing smoothing step. One of ordinary skill in the art would have been motivated to perform such a modification to avoid abrupt visible transitions in the image, as taught by Harrington (col. 5, lines 44-53).

16. Claims 17 & 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & Wang**, as applied to claims 13 & 35 above, in view of U.S. Patent 6,345,104 to **Rhoads**. Koltai discloses a counterfeit-proof layer (col. 15, lines 28-33), but lacks the decoder being a photocopier. However, Rhoads teaches that by including watermark verification features (decoder) into a photocopier, the copier can take action if reproduction of a security document is attempted (col. 3, lines 1-26). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include the decoder in a photocopier. One of ordinary skill in the art would have been motivated to perform such a modification to take action if reproduction of a security document is attempted, as taught by Rhoads (col. 3, lines 1-26).

17. Claims 18 & 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai, Wang & Rhoads**, as applied to claims 17 & 39 above, in view of U.S. Patent 5,767,889 to **Ackley**. Koltai, as modified above, lacks a post-processing step to remove dots that are too close to adjacent dots in a non-object area. However, Ackley teaches that it is useful to eliminate dots on bar code printer to ensure that the bars do not bleed into each other under certain printing conditions (col. 5, lines 43-67). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to remove dots that are too close to adjacent dots. One of ordinary skill in the art would have been motivated to perform such a modification so the dots to not bleed into each other during printing, as taught by Ackley (col. 5, lines 43-67).

18. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & Wang**, as applied to claim 1 above, in view of U.S. Patent 5,659,613 to Copeland et al. (**Copeland**). Koltai discloses generating the watermark (Fig. 13), controlling the printing process to protect the document and the watermark from attack (col. 4, lines 35-40) and generating a decoder device to enable verification of the authenticity of the document (col. 8, lines 8-32 & col. 11, lines 26-34, col. 15, lines 28-34). Koltai lacks verifying the authenticity and copyright of the document before printing. However, Copeland teaches that to ensure legitimate use of a product, such as a DVD, the system searches for an authentication signature/watermark and will not play the disk if it isn't found (col. 1, lines 48-50 & col. 2, lines 35-56). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to verify the authenticity and copyright of the document before printing. One of ordinary skill in the art

would have been motivated to perform such a modification to ensure legitimate use of the printed matter, as taught by Copeland (col. 1, lines 48-50 & col. 2, lines 35-56).

19. Claims 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai** & **Wang**, as applied to claim 23 above, in view of "If One Watermark is Good, Are More Better?" by Mintzer et al. (**Mintzer**).

Regarding claim 41, Koltai discloses that the watermark being included in a document for protection (col. 15, lines 27-34), but not for authentication. However, Mintzer teaches that watermarks are often used to determine if an image has been altered (§1.2 ¶2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to also include information about the document, so as to provide authentication. One of ordinary skill in the art would have been motivated to perform such a modification to verify the content of the object, as taught by Mintzer (§1.2 ¶2).

Regarding claim 42, Koltai discloses watermarking a word (col. 15, lines 27-34).

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

c. Winograd (previously-cited) is noted for teaching that by phase modulating a cover signal (dot pattern) and watermarking the phase-modulated signal (col. 2, lines 54-60), combining any two or more instances of a signal will produce significant distortion

(co. 2, lines 60-65), thereby overcoming problems associated with a collusion attack (col. 1, line 66 – col. 2, line 10).

d. Yamaguchi and Srinivasan are cited for teaching phase modulation.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Simitoski whose telephone number is (571) 272-3841. The examiner can normally be reached on Monday - Thursday, 6:45 a.m. - 4:15 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on (571) 272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJS

October 13, 2006

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